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The Refrigeration Service Engineer

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No. 9

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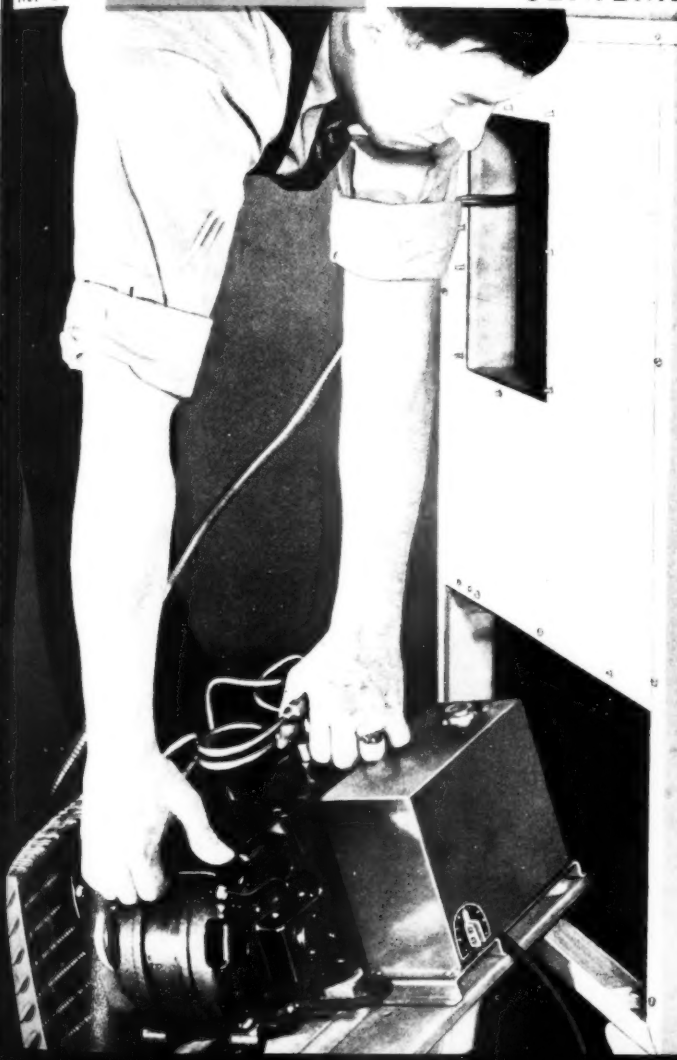

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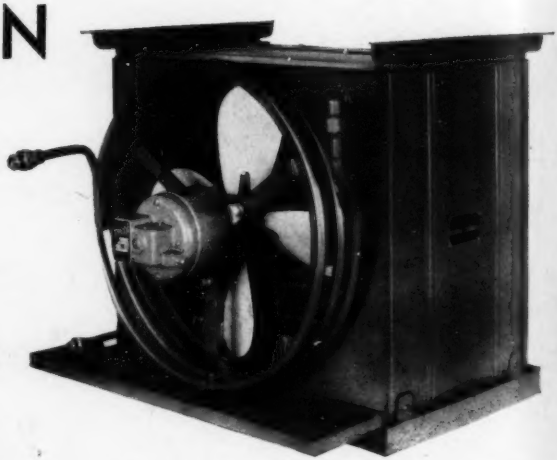

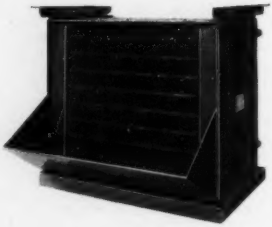

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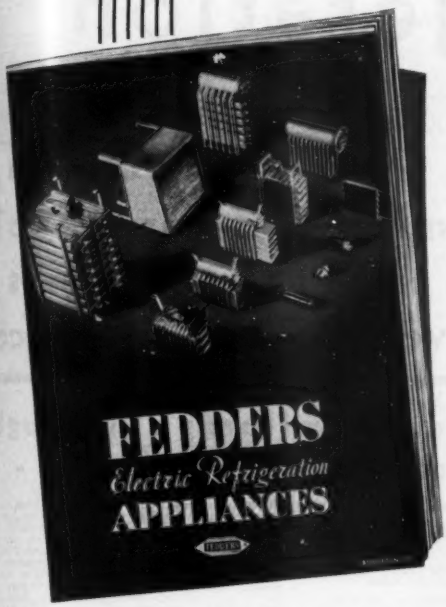

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REFRIGERATION UNITS *and* OIL BURNERS

VOL. 2 SEPTEMBER, 1934 NO. 9

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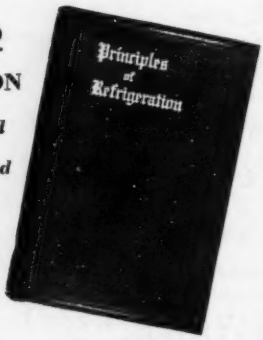

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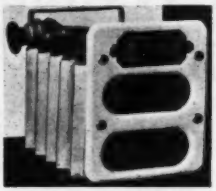

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VOL. 2, NO. 9 CHICAGO, SEPTEMBER, 1934 $2.00 per Annum

The Majestic "Standard" Unit

A Description of the Operation of Models 50 and 51. Illustrations of Various Parts and the Operation of the Rotary Compressor.

THIS article is descriptive of the standard Majestic units Nos. 50 and 51 which were manufactured by the Grigsby-Grunow Co., Chicago, Ill. Figure 1 is a general view of the compressor, motor, condenser, and valve connections. Model 51 is similar in construction to Model 50 except for the electrical equipment control and finned evaporator. The unit is of the "package" type construction, rotary compressor using SO_2 as the refrigerant. The compressor assembly, as shown in Figure 2, consists of the semi-pendulum rotary type mounted on a cast iron cover plate which is secured to a heavy cast iron compressor case. The compressor case acts as a mounting for the stuffing box seal and the discharge and suction shut-off valve. The compressor is driven at approximately 475 revolutions per minute and consists of three moving parts; namely, shaft, impeller and vane. The parts of the compressor are the rear bearing plate, pump body, front bearing plate, housing, seal retaining plate and gaskets.

The compressor assembly is built up on the cast iron cover plate and the rear bearing plate is then placed in position on the cover plate and the pump body secured to it with bolts having the heads counterbored in the body. The impeller and shaft are designed to provide the seal clearance between impeller and body of 7/10,000 of an inch.

Cycle of Compression

The cycle of compression of the rotary Majestic is shown in Figure 3. The method of assembling the compressor is for the vane to be placed in position and the front bearing plate bolted in place. The oil ring is placed over the shaft and held in place by the ring retainer. The pump vane which divides the high and low side during compression is of revolutionary design in that the cylindrical head on the vane oscillates in a cylindrical slot in the impeller and pistons in a vertical slot in pump body due to the motion of the pump impeller. This construction is designed to provide positive contact between impeller and vane.

The front bearing plate, which is bolted and welded to the pump body, serves as the main bearing of the pump. Oiling of the bearings and pumps is accomplished in the following manner: the oil is picked up from the pump housing by an oil ring which rides on a portion of the shaft extending through

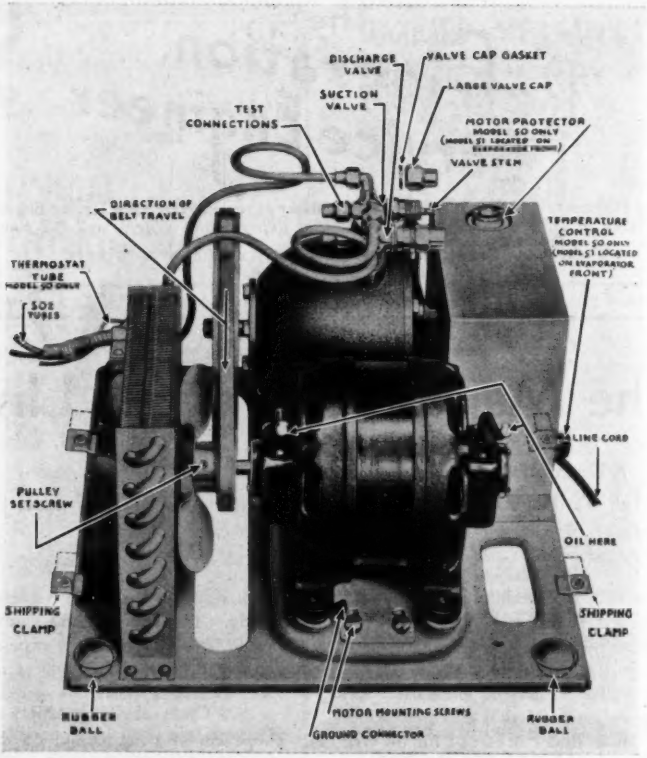

FIG. 1. STANDARD MAJESTIC COMPRESSOR—MODEL 50.

the front bearing plate. The oil is then deposited in a circular groove in the shaft and carried through the bearing by two helical grooves cut in the pump shaft. After the oil has passed through the bearing it is forced through the clearances of the pump due to the difference in pressure between the pump case and displacement chamber of the pump. The oil is then discharged with the compressor gas to the sump at the end of the shaft, where a portion is carried through the rear bearing by two helical grooves to lubricate the bearing and act as a seal for the pump.

The vane is provided with three horizontal grooves toward the discharge side of the pump. These grooves become filled with oil, or lubrication, and gas sealing. Two grooves ground diagonally across the outer side of the vane serve as a bypass connecting the space between the end of the vane and the bottom of the vane slot and the suction side of the compressor to prevent oil locking the vane. Ports are used instead of the conventional type of flapper valve. As shown in Figure 3, the cycle of compression of the Majestic pump is that, when the shaft reaches a pre-determined angle in its revolutions, the discharge ports open and allow the compressed gas to be forced from the compression chamber through the center of the shaft to a sump in the cover plate. A radial hole drilled in the cover plate conducts the gas to the compressor case.

Seal

Figure 4 is a diagram of the seal assembly of the compressor and is of the bellows type, located on the high side of the system.

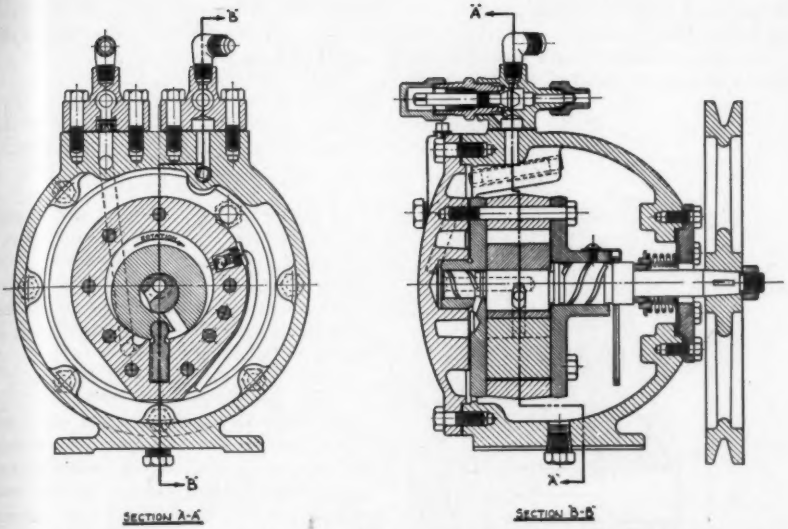

FIG. 2. COMPRESSOR ASSEMBLY OF MODEL 50 AND 51 STANDARD MAJESTIC COMPRESSOR.

Valves

Referring again to Figure 3, it will be noted the relief valve built into the pump body consists of a stainless steel ball held against the seat by a phosphor bronze spring and plug. The discharge from the relief valve is exhausted through the tube, the end of which is always submerged in oil. The oil acts as a seal against leakage of high pressure gas into the pump in event that the valve leaks slightly. Its function is to permit oil or liquid SO_2 to escape from the compression chamber while the compressor is in operation, preventing the compressor from knocking or becoming stalled. The discharge shut-off valve is of the three-way type, to which a high pressure gauge may be installed. When the valve is turned in a clockwise direction the ¼ inch flared gauge connection is closed; when the valve stem is turned in counter-clockwise direction the opening to the compressor is closed. The 5/16 inch flare fitting at the top of the valve

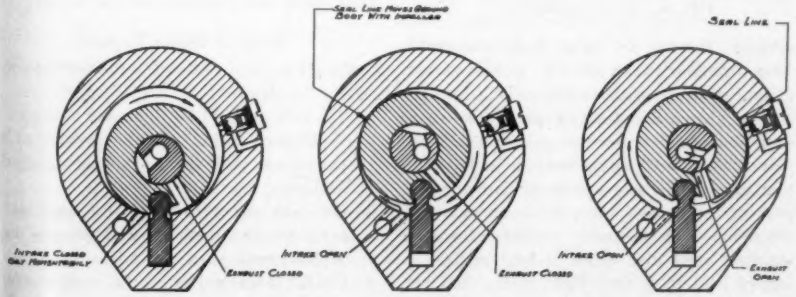

FIG. 3. CYCLE OF COMPRESSION.

is connected to the discharge gas line leading to the SO_2 condenser.

The suction shut-off valve is also of the three-way type of slightly different internal

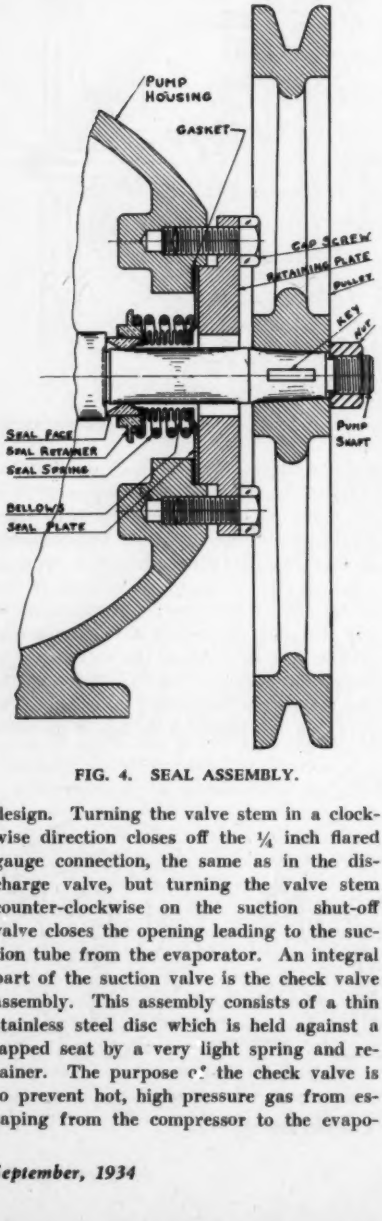

FIG. 4. SEAL ASSEMBLY.

design. Turning the valve stem in a clockwise direction closes off the ¼ inch flared gauge connection, the same as in the discharge valve, but turning the valve stem counter-clockwise on the suction shut-off valve closes the opening leading to the suction tube from the evaporator. An integral part of the suction valve is the check valve assembly. This assembly consists of a thin stainless steel disc which is held against a lapped seat by a very light spring and retainer. The purpose of the check valve is to prevent hot, high pressure gas from escaping from the compressor to the evaporator when the pump stops. If this were allowed, the effect would be a shorter off period than normal.

Evaporator

The evaporator is of the header and tube flooded type regulated by the low side float.

Model No. 51 Unit

As stated before, the No. 51 unit is primarily the same as Model 50 with the exception of evaporator and thermostat. The evaporator on 51 is provided with fins to secure greater heat absorbing surface. The Majestic control also is replaced with a Ranco or Cutler-Hammer.

Electrical Equipment

On Model 50 (50-60 cycle, 110 volts) the control box contains the Majestic thermostat, Majestic relay, electrolytic condenser and motor protector and socket. On odd frequency and d.c. the control box contains Majestic thermostat, motor protector and socket. Should it be necessary to replace a Majestic motor, 50-60 cycle only, by an odd frequency or direct current motor in the field, the control box stand and cover should be replaced by a special stand and cover, as the bases of most motors will not clear the corner of the 50-60 cycle control box.

Motor

Motors used on the standard Majestic line are the condenser start induction run type. A relay actuated by a solenoid coil in series with the running winding closes the starting circuit until the motor is up to speed and then opens the starting winding circuit.

Majestic Motor Repairs

Should the rotor bind, the following points should be checked:

1—Tie rods (should be tightened evenly)
2—Wool yarn spring (see that wool yarn is in contact with shaft—replace spring if broken)
3—Oil wells and wool yarn (if foreign matter is present, wash out with gasoline and replace wool yarn and oil)
4—Shaft (if warped or scored, replace rotor assembly)

If bearing is noisy:

1—Check wool yarn spring as above

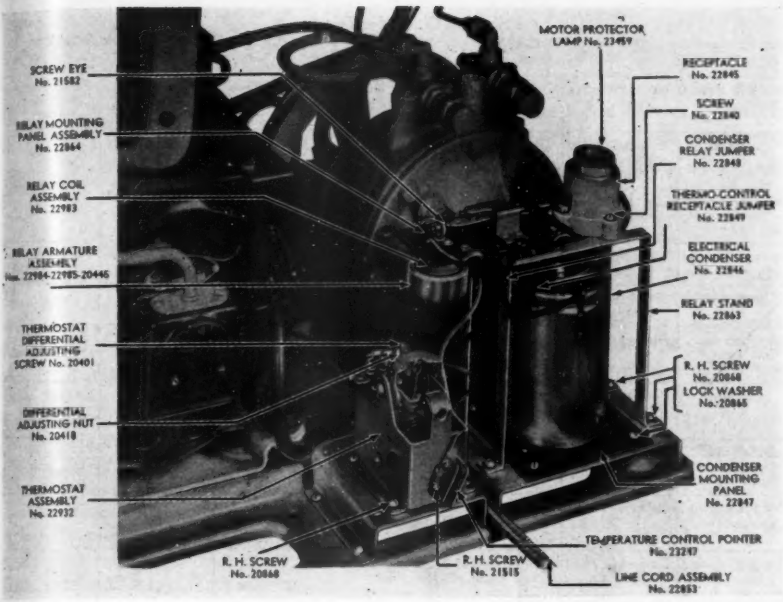
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FIG. 5. CONTROL ASSEMBLY, MODEL 50 MAJESTIC.

2—Check oil in well (use only high grade medium automobile oil)
3—Check thrust pin and spring (replace spring if broken)
4—Check bearing clearance. If sufficient to cause a rattle even when bearing is well oiled, it will be necessary to replace the End Bell

If motor will not start:

1—Check relay (replace if contacts are burned)
2—Check stator for "opens" or "shorts"

To replace stator or end bells:

1—Remove motor base
2—Remove tie rods
3—Tap end bells with hammer to remove
4—Clean edges of stator with wire brush
5—Scrape stator groove on end bells. They must be clean and free from paint or dirt
6—Reassemble motor. Turn nuts on tie rods in succession, a turn to each, until all four are tight. Rotor should turn freely by hand
7—Replace base

Adjusting and Repairing Majestic Relay

If contacts are badly burned it is advisable to replace entire relay assembly. In order to make a proper test of the relay, equipment should be available which will give the proper transformer resistances and meter to give the operator control over the output for the testing of electrical equipment on Majestic refrigerators. With 7 amps. flowing through the relay, coil contacts should be closed without buzzing or chattering. Resistance is added to the coil circuit until the contacts open. This must occur before the current in the coil has reached the value of 6 amps. If contacts do not close at 7 amps., then spring support bracket *up* to increase spring tension. If contacts do not open before the current in the coil has dropped to 6 amps., then bracket *down* to decrease spring tension.

Electrolytic Condenser

The electrolytic condenser is used in conjunction with the secondary winding of the

Service Chart for Diagnosis

SYMPTOMS	CAUSES					
Unit Will Not Start	Motor Protector Blown	Defective Time Lag Switch	Stuck or Locked Pump	Open Circuit in Wiring	Improperly Adjusted Relay	Pitted Points on Starting Switch
continued	No Liquid in Thermo Bellows	Thermostat Out of Adjustment				
Pumps Locks or Sticks	Liquid SO_2 Slushing Back	Relief Valve Spring Stiff or Inoperative	Moisture in System	Excessive Oil Charge		
Overload Cuts Out	Air in System	Low Voltage	Restriction in High Side	Stuck Shut Float Valve	Locked or Stuck Pump	Poorly Adj. Starting Relay
continued	Pitted Relay Contacts	Poor Air Circulation	Discharge Valve Closed	Electrical Defects		
Unit Operates Too Much	Shortage of SO_2	Leaky Float	Air in System	Poor Air Circulation	Thermo Bulb Loosely Clamped	Thermo Out of Adjustment
continued	Compressor Is Defective	Evaporator Needs Defrosting				
Unit Runs but Does Not Refrigerate	Shortage of SO_2	Leaky Float	Check Valve Stuck Shut	Compressor Is Defective		
Unit Freezes Ice Cabinet Too Warm	Poor Door Seal	Poor Air Circulation in Cabinet	Evaporator Needs Defrosting			
Poor Ice Freezing	Cabinet in Too Cold Place	Thermostat Set Too Warm	Foreign Matter in Water			
Cabinet Too Cold	Thermostat Set Too Cold	Short in Electrical Circuit	Thermo Bulb Loosely Clamped	Cabinet in Too Cold Location		
Unit Short Cycles	Leaking Check Valve	Thermostat Out of Adj. Diff.	Poor Door Seal			
Pump Runs Hot	Poor Air Circulation	Air in System	Compressor is Defective			
Unit Is Noisy	Food Shelves Rattle	Unit Shipping Clamps Not Loosened	Fan Blades Striking Belt	Noisy Relay Assembly	Noisy Belt	Slugging Back Liquid SO_2
continued	Loose Tubing Clamps	Seal Squeak				
High Current Consumption	Air in System	Poor Air Circulation	Tight Compressor	Poor Door Seal	Leaky Float Valve	Leaky Check Valve

motor for starting. This condenser is 110 mfd. intermittent duty a.c. electrolytic, of the so-called dry type, sealed in a seamless aluminum can with hard rubber top so that it should not leak or absorb impurities from the air.

Motor Protector and Socket

The motor protector is not a fuse but a time lag overload cutout that will carry the starting current of the motor for sufficient time to start the unit under ordinary conditions.

Specifications

The Majestic "Standard" Compressor is charged with 26 oz. of 151 viscosity white mineral oil. The refrigerant charge is 4 pounds of SO_2.

Current Requirement—90 to 130 volts, 50 to 60 cycles.

Motor—1/8 horse power.

Speed of Motor—1725 revolutions per minute.

Speed of Compressor—475 revolutions per minute.

Walter C. Lippi,
California.

I find the R. S. E. very helpful and it fills a long-felt need in the refrigeration field. Hope it continues to grow with the industry.

The Control of Refrigerants . . .

ARTICLE NO. 13
MAGNETIC SUCTION LINE STOP VALVE

Magnetic Suction Line Stop Valve Provides Individual Temperature Control of Units Fed in Multiple or in Series in Flooded or Semi-Flooded Systems.

By J. L. SHRODE*

THE Magnetic Suction Line Stop valve, generally a packless valve, is used in frosted pipe lines as a suction line shut-off or as a low side by-pass valve. This valve provides individual temperature control of units fed in multiple or in series on either a flooded or a semi-flooded system. Due to the packless construction and the design of the magnet of this type of valve, it may be safely installed in heavily frosted lines and in moist rooms. This valve, as a rule, is designed for use in low side suction lines only and cannot be used in high pressure liquid lines because it is not tight seating.

Construction and Operation

The magnetic suction line stop valve (Fig. 1) is a truly packless valve and all of the

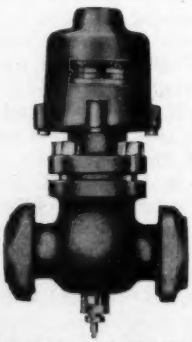


FIG. 1. MAGNETIC SUCTION LINE STOP VALVE.

movable parts operate inside a special metal tube, sealed at the top, which prevents the escape of the refrigerant to the atmosphere. The construction is such that it is impossible for the refrigerant to leak through the joints.

This valve is of the auxiliary operated type as shown in sectional view of a typical suction line valve in Fig. 2. There is a small pilot valve incorporated in the main valve piston. The valve pin of this pilot

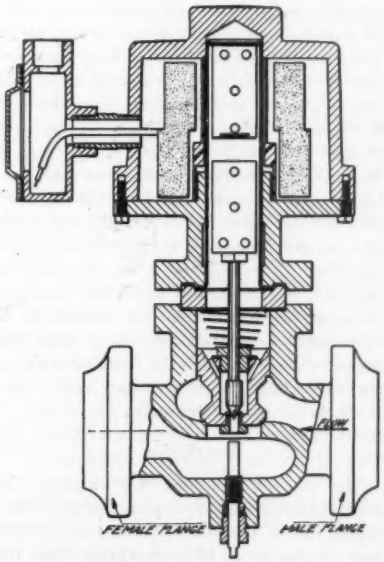


FIG. 2. CROSS SECTION OF MAGNETIC SUCTION LINE STOP VALVE.

valve is rigidly connected to the plunger and when the coil is energized the plunger is lifted, opening the pilot valve first. This relieves the pressure above the main valve piston and permits the plunger, with the assistance of the pressure underneath the piston, to open the main valve. The plunger then holds the valve open as long as the coil is energized. When the coil is de-energized the valve closes and remains closed, stopping

*President, Alco Valve Co.

the refrigerant flow until the coil is again energized.

The magnet coil is placed around the metal enclosing tube and is embedded in waterproof compound. The lead wires from the coil are rubber-covered cable and the construction of the coil assembly is such that it will not be affected by moisture or frost.

Manual operation of the valve illustrated in case of prolonged power failure is made possible by the use of a valve stem at the bottom of the valve. This eliminates the necessity of installing a by-pass around the valve.

A thermostat wired in series with the magnetic coil operates this suction line valve by making and breaking the circuit to it. When used on a multiple system the thermostat closes the suction valve whenever the unit is down to temperature. Since the suction line to that unit is closed, the pressure in that unit builds up and refrigeration is stopped until the thermostat opens the valve. On series systems, the magnetic valve is used as a by-pass valve and in this case the operation of the thermostat is the reverse of that described above. Here, when the room is too cold, the thermostat opens the magnetic valve in the by-pass and the refrigerant is by-passed around the evaporator. When the temperature is too high the thermostat closes the valve and the refrigerant again flows through the evaporator coils.

Installation

The magnetic suction stop valve of the type illustrated must be installed in a horizontal run of pipe with the magnet vertical and at the top. It is necessary that the flow through the valve is in the proper direction or else the valve will not close.

A strainer must be installed ahead of this valve on all applications to keep dirt and scale from the operating parts of the valve. When this valve is used as a by-pass valve it should be installed always at the same level or slower than the inlet connection of the coil. The by-pass should never be installed higher than the coil connections. It should not be necessary for the vapor to travel upward when flowing through the by-pass, for a by-pass should be the path of least resistance to the flow. For the same reason the by-pass should be as short and direct as possible.

As a rule, the electrical connections are not made in the valve but the valve leads are brought out directly in a length of flexible conduit and the connections made outside the valve. The magnetic coil should be protected by the proper size protector fuse.

SERVICE SUGGESTIONS

On the Air Cooled Electrolux

THE following service suggestions will be helpful to the service man, where it may be necessary to change temperature controls, thermostats or removing and replacing unit.

To Remove Temperature Control Assembly

1. Carefully remove cabinet top and top opening screen.
2. Attach Upper Drum Tool No. T-58-81 to Upper Drum "D," Figure 1. Upper drum tool is used to hold cable securely in upper drum grooves when cable tension is relieved.
3. Attach Cable Clamp No. T-59-81 to wire cables between lower drum "E" and cable housing "A," Fig. 2. This adaption holds cable secure in lower drum grooves while drum is removed from thermostat.
4. Loosen R. H. Screw "B," releasing cable housing clip from lower cable housing bracket, Fig. 2.
5. Loosen R. H. Screw "C" holding lower drum to thermostat adjusting screw knob. Remove lower drum from thermostat adjusting screw knob, Fig. 2.
6. Loosen R. H. Screw "M" to release upper drum "D" from shaft "C."
7. Remove front chilling section baffle and pull shaft "C" forward, releasing upper drum "D."
8. Remove nut from bolt "L," releasing upper cable housing bracket "K."
9. Remove complete assembly through upper unit structure.

To Replace Temperature Control Assembly

1. Replace complete assembly through upper unit structure.

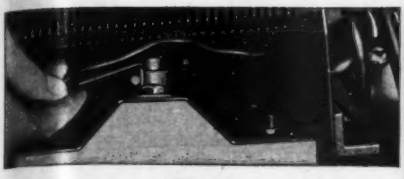


FIG. 1.

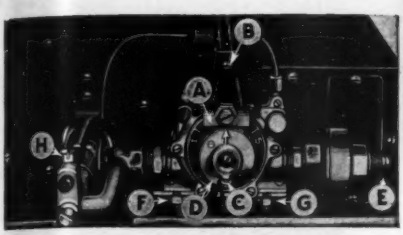


FIG. 2.

2. Replace upper cable housing bracket "K" and tighten nut on bolt "L."
3. Replace front chilling section baffle; at the same time replacing upper drum "D" on shaft "C."
4. Tighten R. H. screw "M" to secure upper drum "D" to shaft "C."
5. Replace lower drum "E."
6. Tighten R. H. screw "M" on lower drum "E" with drum arrow pointing to No. "8."
7. Replace cable housing "G" under lower cable housing clip "H."
8. Pull cable housings upward as shown in Figure 3. Apply sufficient tension to produce a taut cable. If cable is pulled too tight, Temperature Control Knob Pointer will not rotate freely. Should upper and lower drums fail to synchronize, repeat operation, shifting cable housings in opposite directions so that lower drum will turn without moving upper drum until upper and lower pointers both indicate "Normal" and "8" position. Apply proper tension and tighten Lower Cable Housing Clip Round Head Screw.
9. Carefully replace cabinet top opening screen and cabinet top.

FIG. 3.

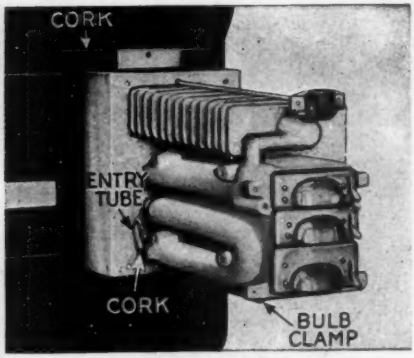


FIG. 4.

To Remove No. 7B Thermostat

1. Turn off gas supply to Electrolux.
2. Adjust temperature control knob pointer to "NORMAL" position.
3. Loosen thermostat bulb clamp under ice cube freezing compartment, Fig. 4.
4. Remove cork at bottom end of entry tube leading through unit shield plate and filler block, Fig. 4.
5. Remove cabinet top and top opening screen. Remove cork at top opening of entry tube, Fig. 4.
6. Pull thermostat bulb through entry tube, exercising care to avoid kinking capillary tubing.
7. Remove unit compartment panel.
8. Pull thermostat bulb downward and out through unit compartment opening.
9. Attach upper drum tool No. T-58-81 to Upper Drum, Fig. 1. Upper Drum Tool is used to hold cable securely in upper drum grooves when cable tension is relieved.
10. Attach cable clamp T-59-81 to wire cables between Lower Drum "A" and

cable housing, Fig. 2. This adaption holds cable secure in lower drum grooves while lower drum is removed from thermostat.

11. Loosen R. H. Screw "B," releasing cable housing clip from lower cable housing bracket, Fig. 2.
12. Loosen R. H. Screw "C" holding lower drum "D" to thermostat adjusting screw knob, Fig. 2. Remove Lower Drum "D" from thermostat adjusting screw knob.
13. Disconnect gas line at gas filter "E."
14. Loosen nuts "F" and "G" and burner bracket set screw "H" to release unit control assembly, Fig. 2.
15. Remove thermostat from control assembly.

To Replace No. 7B Thermostat

1. Assemble gas filter, thermostat and burner, exercising care in adjusting burner to proper flue relation when thermostat assembly is bolted to control mounting plate.
2. Tighten control assembly nuts to control mounting plate. Tighten burner bracket set screw.
3. Connect gas line.
4. Replace thermostat temperature control lower drum to thermostat adjusting screw knob.
5. Make sure arrow on lower drum points to "NORMAL" and tighten Lower Drum R. H. Screw.
6. Replace cable housing under lower cable housing clip.
7. Pull cable housing upward as shown in Fig. 3 and when proper tension is exerted to produce a taut cable, tighten cable housing clip round head screw.
8. Remove cable clamp T-59-81.
9. Pass thermostat bulb and capillary tubing back and up through unit structure. A weighted string will assist in this operation.
10. Remove upper drum tool T-58-81.
11. Insert bulb through entry tube.
12. Replace bulb in chilling compartment clamp and tighten R. H. screws.
13. Replace corks in each end of entry tube.
14. *Test cable tension.* Cables must be tight and in their proper drum grooves. Turn temperature control knob pointer on chilling compartment baffle; if pulleys do not synchronize, repeat operation number seven, shifting cable housings in opposite directions so that lower drum will turn without moving upper drum until upper and lower pointers both indicate "Normal" and "3" position. Apply proper tension and tighten lower cable housing clip round head screw.
15. Replace top opening screen and cabinet top.
16. Turn on gas valve and relight burner.
17. Replace unit compartment panel.

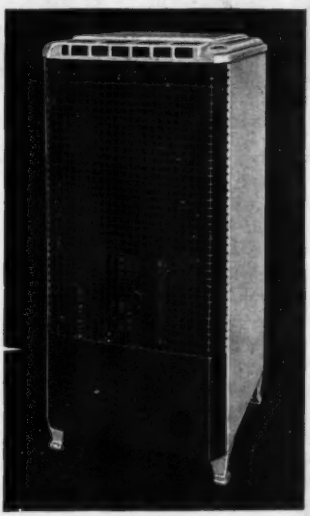


FIG. 5.

Removing Unit From ED-30, 40, 50, 60 and 70 Cabinets

1. Turn off gas supply to Electrolux.
2. Disconnect gas line at unit.
3. Remove cabinet top, top opening screen, and flue ring.
4. Remove ice cube trays, defrosting tray and food shelves.
5. Remove evaporator baffles.
6. Move cabinet away from wall.
7. Remove Rear Panel (Grille), Fig. 5.
8. Remove Dilution Pipe "A," Fig. 6.
9. Remove screw "B" holding Dilution Pipe Extension "C" to side of unit, Fig. 6.

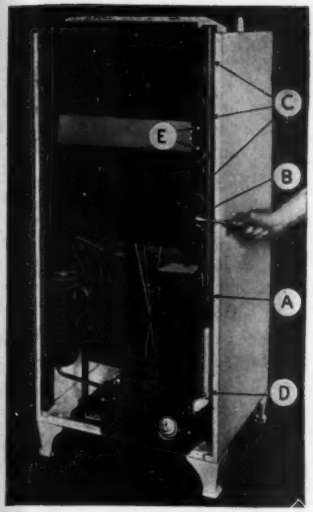


FIG. 6.

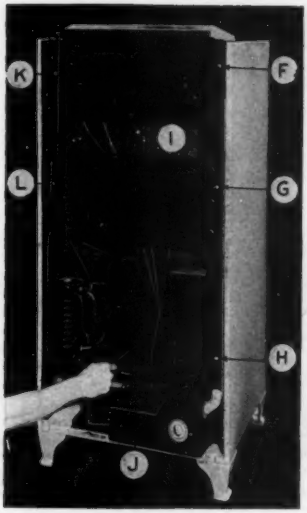


FIG. 7.

10. Slide Dilution Pipe Extension "C" up and out, Fig. 6.
11. Remove Generator Flue Extension "D," Fig. 6.
12. Remove screws "E" at ends of condenser baffle, Fig. 6.
13. Remove wood screws "F," "G," "H," "I," "J," "K," "L," Fig. 7.
14. Carefully lift unit out of cabinet, Fig. 9.

Avoid chipping porcelain liner of Cabinet.

15. Remove all controls in following manner—

(a) Remove temperature control assembly.

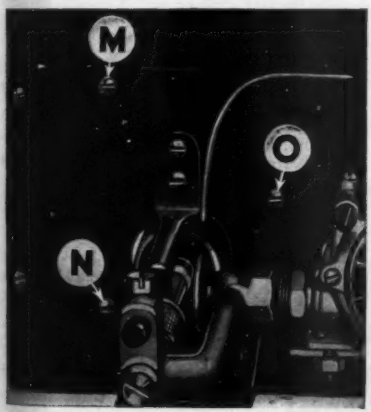


FIG. 8.

FIG. 9.

(b) Remove complete control assembly held in position by screws "M," "N," "O," Fig. 8.

16. Return unit to factory stripped of all controls and accessories.

Replacing Unit

1. Replace unit control assembly.
2. Replace temperature control assembly.
3. Check liner opening gasket for proper sealing.
4. Place unit in cabinet, exercising care to avoid chipping porcelain liner.
5. Replace wood screws "F," "G," "H," "I," "J," "K," "L."
6. Replace condenser baffle.
7. Replace generator flue extension.
8. Replace Dilution Pipe and Dilution Pipe Extension.
9. Replace screw "B" in Dilution Pipe Extension bracket.
10. Attach Dilution Pipe to Dilution Pipe Extension.
11. Replace rear panel (grille).
12. Replace refrigerator for connection.
13. Connect gas line to unit.
14. Light burner.
15. Replace evaporator baffles.
16. Replace ice cube trays, defrosting tray and food shelves.
17. Replace cabinet top opening screen, cabinet top and flue ring.

Metal Tests for Fin Coils

Results of Tests to Determine Conductivity of Metals Commonly Used in Fin Coil Construction.

Editors' Note—The Refrigeration Service Engineer in publishing engineering articles of interest to the service engineer, does so impartially and any conclusions arrived at are not to be construed as the opinions of the Editors. The columns of this journal are at all times available for the presentation of informative articles of interest to our readers. This article contributed by the Aluminum Co., of America.

THE science of refrigeration is full of what, to the lay mind, are paradoxes. Insulation with aluminum foil and refrigeration with a gas flame are two familiar examples. Now two more facts not in themselves obvious have been brought to light; namely, that aluminum fins are fully as efficient as copper fins when placed on cooling coils in spite of their somewhat lower conductivity, and further that a force-fit connection between fins and refrigeration tubing is as efficient as a soldered connection.

These were the two major conclusions arrived at in a series of tests performed by the Larkin Refrigerating Corporation in collaboration with engineers from other refrigeration manufacturers and the Aluminum Company of America, on tinned copper coils fitted with force-fit aluminum fins, force-fit copper fins and soldered copper fins. The tests were intended to determine what difference, if any, there was in the working efficiency of the three types of unit.

The tests were performed in a special 14x16x10 ft. insulated test room built in a corner of the Larkin Plant. At one side of the room was a conventional 4x6x9 ft. cooler of the walk-in type commonly found in butcher shops and grocery stores. Each type of coil in turn was installed in this box and tested under identical conditions for a 120-hour period.

The temperature of the room was kept at 93 deg. F. and that of the box at 38 deg. F. by thermostatic devices. Room temperatures, box temperatures, box humidity and compressor operating time were registered on recording instruments, and the kilowatt-hours of electricity consumed were recorded after each test.

Since the tests were only run over a 120-hour period, the results were close together and did not show any one type of coil to be much more efficient than the others. Compressor operating time and electrical energy consumed were greatest in the tubing with bonded copper fins and least with aluminum force-fitted fins. The power consumed by

the aluminum coil was about three per cent less.

The conservative conclusion to be drawn is that aluminum fins, in spite of their lower thermal conductivity, do not show a correspondingly lower efficiency. It is apparent that other factors besides the conductivity of the extended surface material have a greater effect on the overall efficiency of the unit.

The record charts of the test show that aluminum fins not bonded have a slightly quicker warm up period and hence defrost more quickly.

Testing Metals

This is in accord with a known property of aluminum which should be to its advantage as a fin material. Aluminum has a lower heat content value than copper, which means that fewer heat units are required to change the temperature of aluminum a given number of degrees. In order to demonstrate this fact, the Larkin Corporation ran another series of tests on a composite coil, made with alternate series of aluminum and copper fins. It was shown by a comparison of the ice formation that aluminum fins heat up to a point where the ice will drop off quicker than do copper fins. This may account, in part, for the disproportion between

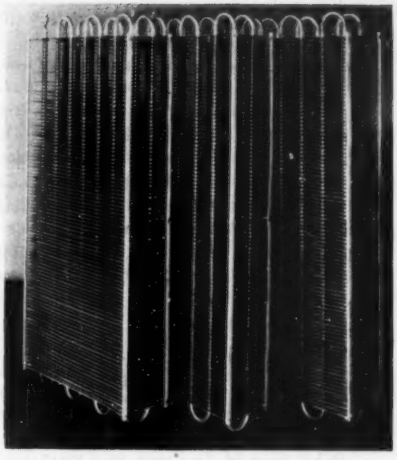


Fig. 1. The three units used in comparing different types of refrigerating coil fins. The unit at the left has aluminum fins pressed on; the center unit has force-fit copper fins; the right hand unit is equipped with soldered copper fins. Tinned copper tubing is used in all three coils.

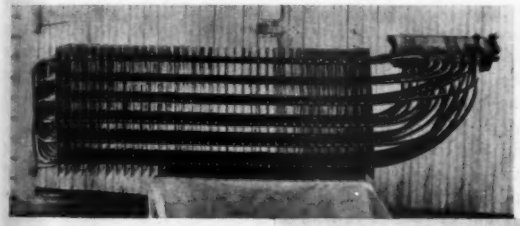


Fig. 2. The first aluminum-finned coil used by the Larkin Refrigeration Corporation as it appeared before its installation.

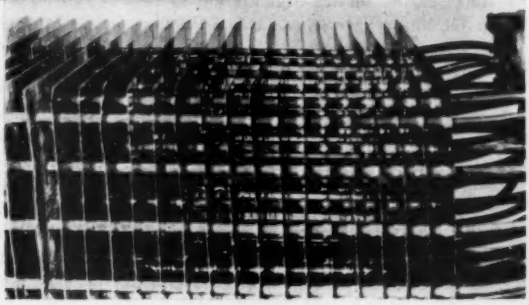


Fig. 3. The original coil five years later. Careful examination revealed no defects and indicated that the unit was practically as good as new.

the high efficiency of aluminum as a coil fin and its lower conductivity in relation to copper.

There have been many thousand aluminum-finned coils placed in service since 1927. As in the tests, the service records also bring out some unexpected facts. For example, it is an article of belief in metallurgical circles that the contact of dissimilar metals will generally bring about corrosion of the metal higher in the electrochemical series, yet aluminum fins have been used in contact with finned copper tubing since 1927 and show no sign of attack. This may be accounted for by the low temperature and by the repeated washing which occurs at every defrosting. The water condensed from the air is fairly clean and free from salts.

While the Larkin Corporation uses tinned copper tubing with aluminum fins for most refrigerants, they use tubing of aluminum for ammonia installations.

The light weight of aluminum fins may also bring about a considerable saving in shipping and installation costs. For example, the aluminum finned coils used in the test weighed 71 lb., while the bonded copper coils weighed 211 lbs.

Building "Off-Season" Servicing

What Should Be Done to Offset Slack Winter Periods. Oil Burner Servicing Is a Large Field Which Many Service Organizations Are Investigating

THE refrigeration service man in many sections of the country is faced with the problem of reduced service demand for refrigeration work usually starting at this time of the year and continuing until the early spring season. This decreased demand can be partially compensated for by intensified work during the winter months on reconditioning commercial equipment which rehabilitation is usually deferred until the cooler months of the year, if possible.

As has been pointed out in these columns in previous issues, refrigeration and heating are somewhat closely allied and represent, due to their seasonal demand, an ideal combination for all-season servicing. If it is possible for the service organization to develop oil burner servicing, it is of course most desirable. Many service organizations have investigated the field of oil burner servicing and have found that it opens a lucrative field for service work.

The refrigeration service organization has built up many valuable customer contacts and users of mechanical refrigerators will be found to be in the vast majority among oil burner users. There are a number of devices and accessories employed on both refrigerators and oil burners which are of a similar nature and which the refrigeration service man is familiar with, as for example, controls and motors. Several large manufacturers of mechanical refrigerators have recognized seasonal fluctuations, and within the past year announcements have been made of the development of oil burner equipment. There is no question but that the oil burner sales are increasing steadily each year. In future issues of THE REFRIGERATION SERVICE ENGINEER further articles will be published relative to combination refrigeration and oil burner servicing.

Of course, oil burner servicing, like refrigeration servicing, presents problems which may have little to do with the actual mechanical operation of the equipment but may be traced to incorrrect installations.

The service engineer "shooting" oil burner troubles must be thoroughly familiar with the conditions which may cause this trouble. Proper combustion is probably one of the foremost considerations in a good oil burner installation. Combustion is principally a matter of proper draft. In the following extracts of an article by P. E. Hansler, editor of *Oil Heating*, which article appeared in that magazine, and reprinted with the permission of The Hays Corp'n, some funda-

mental suggestions are given for determining if the installation is securing proper draft.

Using every-day language, I can say that draft probably is the most important and the most variable factor in the success of a burner installation, assuming that the burner is capable of performing its duty. Of all the unknown elements confronting the dealer, draft is the one thing he can't afford to gamble with, as it easily may represent the force that makes the burner unsatisfactory to the customer and results in refusal to complete payments or an order to remove the burner.

Draft is what we call a *static* force; that is, a force *at rest,* but one that can produce energy if it is turned loose. A tank full of water on an elevated platform is static. The water will run (through the force of gravity) down a pipe and through a water motor, doing useful work, if we open a valve. Draft is *not* air in motion; rather, draft can, under proper conditions, *start and maintain air in motion.*

If we again consider this elevated tank of water, we say that the water has a "head" of so many feet, or so many pounds, meaning the *difference* in pressure between the surface of this water and the ground level. If we open a valve allowing water to run to the ground through a straight piece of pipe, the flow will be at a rate determined by the size of the pipe. But, suppose that we were to make up a discharge line with a lot of elbows, and a return bend or two, and some short nipples, and a reducing fitting. It is easy to see that the water would run out at a much slower rate, although the "head pressure" has not been reduced. What we have done is to introduce a discharge line having greater resistance to the water flow. And the *hydro*static pressure (which really is the weight of a water column as high as the water tank), will empty the tank at a rate depending upon the resistance of the pipe.

Just so with draft. If we set up a condition such that we have a draft of 0.01-in., we are establishing an *aero*static pressure difference between two points, just as we had a *hydro*static pressure between tank and ground. If, now, we open an air path between these two points, there will be set up a flow of air, the volume depending upon the resistance to air flow between the two points. And this air flow is *not* draft, but *the action resulting from draft.*

The purpose of a chimney is to provide a place and means for setting up a draft (that is, maintaining a difference in pressure) that will cause air to flow through the combustion chamber, boiler or furnace passes and chimney, drawing in air for combustion and expelling the products of combustion at the top of the stack.

The draft that I have been talking about has been *natural* draft: that is, draft brought about by natural forces. And that means a chimney or stack. If, for any reason, we wish to get rid of the stack (in large part) we can do so by setting up this draft force by mechanical means. We can put a fan at the top of the stack and suck out, or induce, the products of combustion, or we can use a blower to force air into the combustion chamber and through the boiler. Obviously, if we can supply a draft (force) with a blower, we do not need a high stack.

Careful Check Necessary

The modern burner is equipped with a blower that can furnish much of the required draft, yet the dealer must be sure that this ability is not more than offset by a defective flue, otherwise he is in for a sorry time with costly service calls and hunting after the trouble.

Chimney efficiency increases with increasing flue-gas temperature, up to, approximately, 600° F., but further temperature increase causes the chimney *efficiency* to drop off, although its *capacity* (that is, the quantity of flue-gas it is carrying) is not, of necessisty, following in the same ratio.

When a boiler is operated near its rated load, the draft losses through the boiler will be a maximum, the velocity of gases through the system will approach a maximum, and while the *available* draft would be materially reduced, the chimney *capacity* would be at its maximum. This is the condition we would have in a home where the boiler and chimney had been selected and designed for oil firing, and where the burner is properly set for operation at the maximum desired capacity.

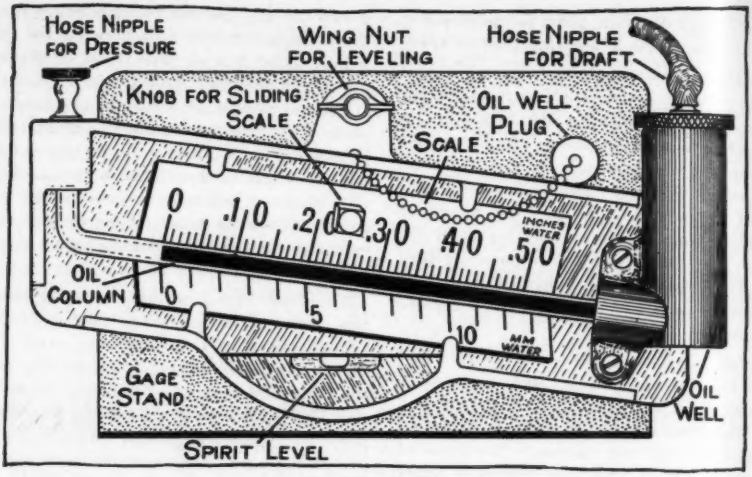


FIG. 1. POCKET DRAFT GAUGE.

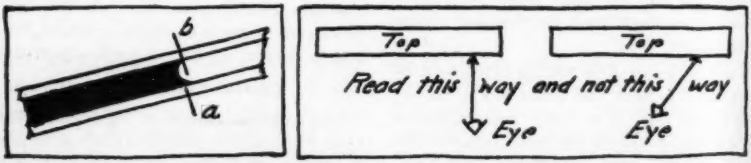


FIG. 2. IT MAKES A DIFFERENCE AT WHAT ANGLE YOU READ THE GAUGE.

Instruments for Draft Measurement

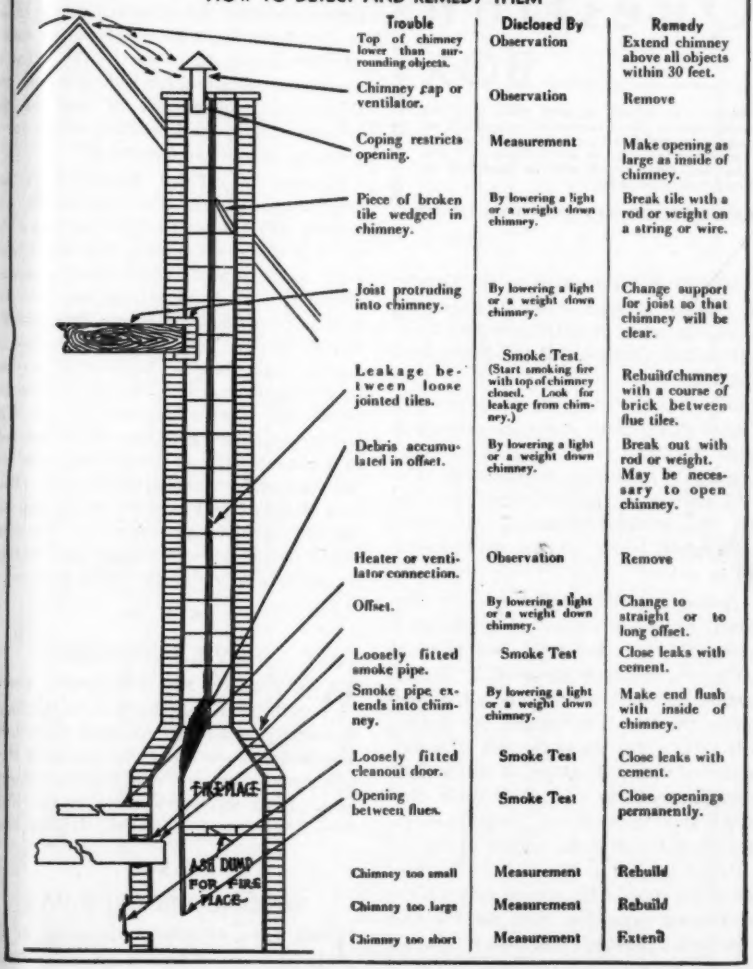
Figure 1 shows the "works" of a commercial pocket gauge suitable for use by the oil-burner man. To set up the gauge it is set on a solid, smooth base and carefully leveled with the screws or other device provided by the manufacturer. Then some of the colored oil that goes with the gauge is poured into the oil well, which acts as the vertical leg of the gauge, until the oil appears in the inclined leg and the gauge reading is close to zero. (Of course the needle valve at the upper end of the inclined tube has been loosened so that the end of the tube is at atmospheric pressure.) This is why the scale is made to slide. It is almost impossible to put in *just* enough oil to make the end of the coil column come *exactly* to the zero line, so the scale is set at the *exact* point after the oil has been put in to bring it to the approximate point.

If you never have used a draft gauge, you will be puzzled as just how to read the end of the oil column, because it is not square across the end and where you are interested in hundreds-of-an-inch, you can't monkey with your readings. The end of the oil column will form a hollow curve (Fig. 2) and you either can read the bottom of the hollow, as at a, or the point of contact with the walls of the tube, as at b, provided you always follow the same plan in setting the zero point and reading. But reading as at a is more apt to be accurate. Be sure and have your eye at right angles to the tube where you are reading (Fig. 2), and don't glance along the tube and expect to get an accurate reading.

After all this preliminary and primary stuff you should have no difficulty in intelligently using a draft gauge, even if you never saw one before—and I know many oil-burner dealers, salesmen and even service and in-

SOME COMMON CHIMNEY TROUBLES WHICH CAUSE INSUFFICIENT DRAFT, AS DETERMINED THROUGH USE OF A DRAFT GAGE

HOW TO DETECT AND REMEDY THEM



Trouble	Disclosed By	Remedy
Top of chimney lower than surrounding objects.	Observation	Extend chimney above all objects within 30 feet.
Chimney cap or ventilator.	Observation	Remove
Coping restricts opening.	Measurement	Make opening as large as inside of chimney.
Piece of broken tile wedged in chimney.	By lowering a light or a weight down chimney.	Break tile with a rod or weight on a string or wire.
Joist protruding into chimney.	By lowering a light or a weight down chimney.	Change support for joist so that chimney will be clear.
Leakage between loose jointed tiles.	Smoke Test (Start smoking fire with top of chimney closed. Look for leakage from chimney.)	Rebuild chimney with a course of brick between flue tiles.
Debris accumulated in offset.	By lowering a light or a weight down chimney.	Break out with rod or weight. May be necessary to open chimney.
Heater or ventilator connection.	Observation	Remove
Offset.	By lowering a light or a weight down chimney.	Change to straight or to long offset.
Loosely fitted smoke pipe.	Smoke Test	Close leaks with cement.
Smoke pipe extends into chimney.	By lowering a light or a weight down chimney.	Make end flush with inside of chimney.
Loosely fitted cleanout door.	Smoke Test	Close leaks with cement.
Opening between flues.	Smoke Test	Close openings permanently.
Chimney too small	Measurement	Rebuild
Chimney too large	Measurement	Rebuild
Chimney too short	Measurement	Extend

FIG. 3. COMMON DRAFT TROUBLES.

stallation men who haven't yet found out the many ways that a draft gauge can be used to advantage.

How to Use the Draft Gauge

In Fig. 3 have been gathered together about all the causes of defective draft that can be thought of, together with the usual method of detection and the remedy.

The chimney for a residence should have a draft intensity between .12 and .16. (Draft figures are in decimals of an inch of water.)

(Continued on page 29)

THE Question BOX

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment as well as oil burners to "The Question Box" which will be answered by competent authorities.

QUESTIONS submitted to the Greater Chicago Chapter of the Refrigeration Service Engineers' Society, answered by C. E. Hamilton, Chairman of the Educational Committee.

Question 52. (1) What is the correct way to install thermostatic expansion valves with Larkin Fin Type Coils? (2) Is there any advantage in connecting the expansion valve to the bottom of the coil rather than the top? Also, would it be advisable to connect one expansion valve on two 108-C Larkin Coils in series?

ANSWER. (1) The installation of the thermostatic expansion valve, that is whether it is connected to the top or the bottom of the Larkin Coil, is largely governed by the application and coil installation. The most common practice is to connect the thermostatic valve to the top of the coil. Connecting the valve to the bottom of the coil will oftentimes result in a large hold-over when the machine shuts down. Sometimes the valve is connected to the bottom of the coil to correct trouble in the form of the frost back at the start of the operating cycle. (2) One thermal expansion valve may be used on two 108-C Larkin Coils hooked in series. However, it is usually advisable to use an individual valve in each coil in the installation.

Question 53. I am interested in knowing the specifications of the oil used in the Norge compressor. If possible, I would appreciate your giving me this information.

ANSWER. For the Norge compressor it is recommended to use Suniso No. 3, viscosity 150, at 100° F.

Welsbach Refrigerator

Question 54. I am having some difficulties in servicing the Welsbach refrigerator. (1) Is ethyl chloride used? If so, how much? (2) How much oil is used? (3) What is the correct pressure for high side and low side? (4) Is it possible to wash out the system? If so, what would you use for a wash and how would you use it?

ANSWER. (1) Ethyl chloride is the refrigerant used in the Welsbach machine. 16 ounces. (2) Eskimo Ice Machine Oil sold by the Gulf Refining Company is recommended, filled to the top of the lubricant separator chamber. (3) Domestic service—low side approximately 20 in. vacuum; high side, 8½ lbs. at 75° F. Temperature is checked by putting a thermometer in the well provided in the liquid receiver. (4) The system can be washed out with denatured alcohol. This is done by submerging one end of the tube in a can or bottle of alcohol and attaching the other end to the expansion valve. Running the machine will draw the alcohol into the system to be discharged at the liquid receiver. Air pressure can be used to force the refrigerant out of the liquid receiver.

SERVICE POINTER

WE formerly had considerable trouble with the Kelvinator here in the South, due mostly to seal and discharge valve leaks. We started to use about two ounces of Pyrol to a compressor and found it of considerable help. Have any service men in the North tried it?—*Thomas L. Carnell, Atlanta, Ga.*

MAKING RECORDS PAY

THE series of articles appearing in THE REFRIGERATION SERVICE ENGINEER, "Making Records Pay," on practical accounting for service companies, will be continued in the October issue. The author, Mr. J. B. Cook, and his associates, are now making surveys among service organizations and compiling forms and records which will be described and published in the articles to appear in the October and subsequent issues.

CHART NO. 16

PRESSURE-TEMPERATURE RELATIONS IN SULPHUR DIOXIDE, METHYL CHLORIDE AND FREON SYSTEMS (KELVINATOR)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
				Air-Cooled Condenser			Water Cooled Condenser			
Temperature	Sulphur Dioxide Pressure	Methyl Chloride Pressure	Freon Pressure	Operating Sulphur Dioxide Condenser Pressure at Suction Pressure of—	Operating Methyl Chloride Condenser Pressure at Suction Pressure of—	Operating Freon Condenser Pressure at Suction Pressure of—	Outlet Water Temperature	Operating Condenser Pressure For—		
								Sulphur Dioxide	Methyl Chloride	Freon
	Shut Down Test			12 lbs. 0 lbs. 12"	28 lbs. 11 lbs. 2 lbs.	37 lbs. 18 lbs. 7 lbs.				
50°	19 lbs.	36 lbs.	47 lbs.				73°	44 lbs.	69 lbs.	88 lbs.
55°	22 lbs.	41 lbs.	52 lbs.							
60°	26 lbs.	46 lbs.	58 lbs.	61 lbs. 54 lbs. 48 lbs.	89 lbs. 83 lbs. 75 lbs.	110 lbs. 103 lbs. 94 lbs.	81°	53 lbs.	82 lbs.	101 lbs.
65°	30 lbs.	52 lbs.	64 lbs.							
70°	35 lbs.	58 lbs.	70 lbs.	71 lbs. 66 lbs. 58 lbs.	104 lbs. 97 lbs. 87 lbs.	125 lbs. 117 lbs. 106 lbs.	89°	63 lbs.	95 lbs.	115 lbs.
75°	40 lbs.	65 lbs.	77 lbs.							
80°	45 lbs.	72 lbs.	84 lbs.	84 lbs. 78 lbs. 70 lbs.	120 lbs. 113 lbs. 102 lbs.	142 lbs. 133 lbs. 121 lbs.	97°	74 lbs.	110 lbs.	130 lbs.
85°	51 lbs.	79 lbs.	92 lbs.							
90°	57 lbs.	87 lbs.	100 lbs.	100 lbs. 93 lbs. 84 lbs.	140 lbs. 131 lbs. 119 lbs.	161 lbs. 152 lbs. 139 lbs.	105°	87 lbs.	125 lbs.	146 lbs.
95°	63 lbs.	94 lbs.	108 lbs.							
100°	70 lbs.	102 lbs.	117 lbs.	118 lbs. 110 lbs. 100 lbs.	160 lbs. 151 lbs. 138 lbs.	183 lbs. 173 lbs. 160 lbs.	113°	104 lbs.	142 lbs.	163 lbs.
105°	77 lbs.	110 lbs.	126 lbs.							
110°	85 lbs.	118 lbs.	136 lbs.	137 lbs. 130 lbs. 120 lbs.	158 lbs.	182 lbs.				

COURTESY OF KELVINATOR—
HERKIMER INSTITUTE OF REFRIGERATION, N. Y.

16

Cut out along outer line and insert in binder for ready reference.

FOR LEATHER BINDER WRITE TO H. T. McDERMOTT, SECRETARY REFRIGERATION SERVICE ENGINEERS' SOCIETY
433 N. WALLER AVE., CHICAGO, ILL.

The REFRIGERATION SERVICE ENGINEER

A Monthly Illustrated Journal, Devoted to the Interests of the Engineer Servicing Refrigeration Units, Oil Burners and other Household Equipment.

Vol. 2 September, 1934 No. 9

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Official Organ
REFRIGERATION SERVICE ENGINEERS' SOCIETY

WORK TO BE DONE

REFRIGERATION service departments of domestic refrigerator manufacturers, as well as an increasing number of independent organizations, have established themselves definitely as a constituent part of sales and merchandising. As the sale of units increases each year, the relative requirements for servicing increases proportionately. Today the number of individuals engaged in this business represents a considerable number. The industry has undoubtedly experienced "growing pains" which, after all, is a healthy indication. As is to be expected with an industry that has witnessed such numerical growth in a short time, there are conditions which should be rectified, so that the advancement of efficient refrigeration servicing will not be hampered.

The attainment of somewhat ideal conditions in the industry can be accomplished only through coordinated effort. Through such effort the attention of those interested is focused on the activity and advancement which the industry is enjoying. There is much to be accomplished for the mutual benefit of all.

The Refrigeration Service Engineers' Society, although a young organization, has made definite progress in the work that it has thus far done, providing an opportune medium for the coordination of all efforts.

To further the work of this organization, the first Annual Convention of service men ever called is scheduled to meet in Chicago on October 11, 12 and 13. The program of educational features will be well worth the time expended by any service man. The entire program has been designed for an intensive educational meeting as well as the consideration and adoption of a program for the future activities of the organization.

All service men are invited to attend this first convention. It represents an important progressive step in the future of the servicing business.

AGAIN—AIR CONDITIONING

AIR conditioning installations have received added impetus during the past year, and more especially during the past summer months. The public's interest in air conditioning has increased considerably because of the abnormally hot weather experienced throughout the country. Most encouraging, of course, is that, of all the major industries during the years of depressed business conditions, refrigeration has been the one shining example in maintaining and increasing its sales volume. A most enviable record to be sure.

The continued healthy growth of domestic refrigeration, together with a more universal acceptance of air conditioning has placed the refrigeration market in a position which has attracted considerable attention.

Prominent architects and building contractors maintain that new construction of residences, offices, etc., will not be complete unless air conditioning is a component part of the plans. It will be as essential as the heating system.

The public has experienced the advantages and comforts of air conditioning. The Chicago Century of Progress has emphasized in its numerous applications of air conditioning the ideal climatic conditions which can be secured irrespective of weather. Exhibitors report an unusual public interest in systems for domestic air conditioning.

(Continued on Page 29)

REFRIGERATION SERVICE ENGINEERS' SOCIETY

Official Announcements of the activities of the National Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.

THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; with special reference to servicing and installation of domestic and small commercial equipment; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

ASSOCIATION HEADQUARTERS: 433-435 North Waller Ave., CHICAGO, ILL.

the CHICAGO CONVENTION

THE FIRST NATIONAL CONVENTION OF SERVICE MEN EVER HELD

OCTOBER 11, 12 and 13th

CONDITIONS are changing rapidly in the refrigeration servicing business. The profession is rapidly expanding. A continuous yearly increase in mechanical units sold assures a definite future for the business of domestic and commercial servicing.

Keep abreast of the times. Plan to attend the first annual convention of the Refrigeration Service Engineers' Society and obtain a first-hand picture of the newest developments in refrigeration as it applies to the service engineer.

The Educational Program will represent an intensive three-day post-graduate course in refrigeration servicing and each session will be crowded with practical information. It is an important meeting for all service men to attend.

Low round-trip transportation rates to Chicago prevail throughout the country.

PLAN TO BE IN CHICAGO, OCTOBER 11, 12 and 13th

CONVENTION MEETINGS

will be held in

CHICAGO CHAPTER'S

Permanent Quarters

2111 West Jackson Boulevard

CHICAGO CHAPTER has extended an invitation to the National Society to hold its annual convention in their permanent meeting place at 2111 W. Jackson Blvd.

These quarters are situated on one of the principal thoroughfares of the city, conveniently located to Chicago's downtown business section and other points of interest. Rapid transportation by bus, surface lines and elevated makes this location only a few minutes from Chicago's loop and provides direct transportation to the Century of Progress.

Hotel accommodations at reasonable rates in downtown Chicago or adjacent to the convention headquarters are available. Further information on hotel rates are given on the following page.

S S S

WELCOME TO CHICAGO

ON behalf of the members of Chicago Chapter I am indeed pleased to extend to every service man a most cordial welcome to be our guests at the first Annual Convention of the Refrigeration Service Engineers' Society.

We are all working toward a common goal and it is only through associated effort as provided by our Society that we can look forward confidently to the recognition of the servicing profession and the important position it occupies.

The educational program provided for this meeting is designed to furnish valuable and practical information which every service man can apply in his everyday practice. Then too, the Chicago Century of Progress is really one of the wonders of the century and well worth a visit to Chicago.

Again, may I say that Chicago Chapter looks forward to acting as your host during your visit to the Convention, and we further say that the latchstring is outside for all service men at our permanent meeting quarters. We'll be seeing you in Chicago.

Yours very truly,

T. J. FOWLER, *President,*
Chicago Chapter No. 1.

S S S

THE CONVENTION PROGRAM

THE tentative program arranged for the first annual convention will cover a diversified list of subjects of the greatest importance to every service man.

The papers and educational discussions will be presented by recognized authorities in their respective fields.

The educational program will be the outstanding event of the Convention and will present an intensified post-graduate course on subjects every service man is vitally interested in.

The tentative program is as follows:

Defining Refrigeration Servicing and Installation.

Remedying Oil Bound Evaporators.

Overcoming Excessive Dirt in Refrigerating Systems.

Estimating Repairs and Installations.

Discussion and Data on Pressure Drop of Refrigerants Through Tubing.

Benefits and Field for Modernization of Obsolete Apartment Equipment.

What Should Be Done to Fill in Off-Peak Season.

Air Conditioning.

The Value of the Refrigeration Service Engineers' Society to Its Members.

Thermostatic Expansion Valves.

Air Conditioning Equipment and Coils.

Control Valves for Refrigerating Appliances.

Ice Cream Cabinet Servicing.

Accounting Systems for Service Organizations.

Qualifications of an Efficient Service Man.

Refrigerants.

Evaporators and Fin Coils.

Controls.

Commercial Installations.

Installation Codes.

Ice Cream Freezers.

HOTEL ACCOMMODATIONS

DESIRABLE and economical hotel accommodations are available within a few minutes of the convention headquarters and also within a short distance of the downtown business section of Chicago. Direct service to the gates of the Century of Progress from the meeting place.

Special hotel rates have been extended to members of the Refrigeration Service Engineers' Society who are planning to attend the Convention, and accommodations can be secured as follows: Single room, with bath, $1.50 per day; double, with bath, $2.00 per day. At the Y.M.C.A. desirable rooms with detached bath, single, $1.25 per day, with recreation facilities such as the gymnasium and pool available to guests; also plenty of protected parking space available without cost.

Economical meals may be secured at any of the hotels.

The National Secretary's office will be glad to arrange for reservations at the above rates. In writing, advise of accommodations required, and rate.

HOTEL RESERVATIONS

Service men planning to attend the Chicago Convention are invited to use the facilities of the National Secretary's office in making hotel reservations. State accommodations required and approximate rate.

Installation and Servicing in Czechoslovakia by R.S.E.S. Member

THE following letter from Mr. George Monjian, a member of the Chicago Chapter, tells of the refrigeration activities of Mr. Joseph Horak, a Member-at-Large of the Society, located in Czechoslovakia.

"A short time ago, I brought with me to the meeting a very distinguished European refrigeration manufacturer by the name of Joseph Horak who is one of the partners in a very large service and installation concern operating in Czechoslovakia under the name of The Horak Brothers Refrigeration.

"I am enclosing a picture of Joseph and one of his draft beer installations which I believe would be of interest to the service men of this country. Note particularly the location of the faucets above the bar.

INSTALLATION OF BAR IN CZECHOSLOVAKIA. NOTE LOCATION OF DISPENSING FAUCETS ABOVE THE BAR.

"Joe visits this country every other year to study American methods of modern refrigeration, and we hope that he will visit Chicago at that time as he will be remembered for the very interesting talk he gave on advancement of mechanical refrigeration in his country."

S S S

St. Louis Chapter No. 1

Meeting of July 12

THE first of the summer meetings of the St. Louis Chapter R. S. E. S. held at the Cabanne Branch Library July 12th was called to order by President Robbins at 8:30 P. M. The minutes of our meeting of Saturday, June 16th, were read and approved as read.

President Robbins told the assembly of the National convention of the R. S. E. S. that is to be held at Chicago on the dates of October 11th, 12th and 13th.

The subject of dues was brought before the house and delinquent members were urged to pay in full as soon as possible. President Robbins spoke of the necessity and importance of every member being paid up.

For the benefit of members not present at previous meetings President Robbins reviewed the educational program being outlined for the coming year.

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"With Estimating Service for Service Engineers"

SERVICEMEN SUPPLY CO.
1819 Broadway, NEW YORK CITY
WRITE FOR NEW PRICE LIST

"OFF-SEASON" SERVICING

(Continued from page 21)

Finding the Draft Intensity

With an old icepick or a small drill, make a hole in the smokepipe between the chimney and any dampers or draft regulator. We want to find the draft intensity of the chimney and, if we measure the draft at such a point that forces other than that due to the chimney are allowed to act, we do not get an accurate measure of the force.

With the fire burning briskly close the ash-pit door and insert the metal draft-gauge tube into the hole in the smokepipe. It is desirable to have the end of the tube about in the axis of the pipe, which is easily accomplished by holding the tube at a point distant from its end about equal to the radius of the pipe and then pushing the tube in to the point where it is held. The draft gauge will now indicate that draft intensity and, in all probability, it will read between .12 and .16. If it is higher than .16 you at least are assured of ample draft intensity and, using one of the draft regulators that should form part of every burner installation, you can reduce this to whatever intensity you later determine will give the best operating conditions, and hold it there without appreciable variation.

(To be continued)

AGAIN—AIR CONDITIONING

(Continued from Page 24)

This all adds to the refrigeration load and forecasts the future of refrigeration servicing and the requirements of refrigeration which the service man will have to familiarize himself with.

With new improvements in domestic and commercial refrigeration, new applications constantly being made, the service man is compelled to maintain step with the advancement of the field.

CLASSIFIED ADS

OPPORTUNITY FOR QUALIFIED SERVICE MAN

WANTED—A qualified refrigeration service man experienced on all makes of refrigerators, especially good on Kelvinators and Frigidaires, for a year-round position. State past experience. Location is in the southern part of the United States. Address MTH, c/o THE REFRIGERATION SERVICE ENGINEER, 433 N. Waller Ave., Chicago, Ill.

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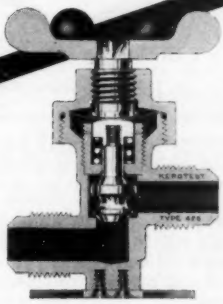
to all refrigeration service engineers



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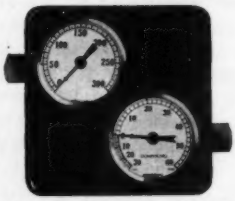

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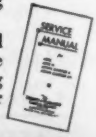

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10 lb. SO_2 or 6 lb. Methyl Drum	6.00
20 lb. SO_2 or 35 lb. Methyl Drum	10.00
Carbon Tetrachlorides, per gal	1.60
All White Anhydrous-Vacuum Oil Co. Refrigeration Oil, 300 Viscosity, Pour test —25° per gallon	1.60
Calcium Chloride, 100 lb.	3.25
½" or ⅜" Door gasket, per ft.	3c
Automatic pressure water valves	6.00
Penn Cold Controls	3.95
Penn JP Low-side Control	6.00
Penn LS Dual Control	13.20
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2½" U S Pressure Gauge	1.00
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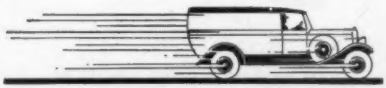

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Penn Commercial Controls	4.50	Amer. Rad. Multiple Exp. Valve	7.50
Amer. Rad. Household Exp. Valve	2.50	Penn Commercial Controls	$8 & $12.00
Amer. Rad. Multiple Exp. Valve	3.50	Iso Butane (Freezol), Per lb.	1.25
Apex Water Regulating Valve	3.50	Methyl Chloride, Per lb.	.70
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We also carry a complete stock of Gilmer Belts, Penn Water Regulating Valves, Glass Defrosting Trays, Lead and Fibre Gaskets, Etc. WRITE FOR PRICES.

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In this and past issues of THE REFRIGERATION SERVICE ENGINEER are published valuable charts — Complaint Charts and Trouble Chart. Other charts will be published in succeeding issues. Provision is made so that these charts can be cut out of this issue and filed conveniently in the new binder. You should have a binder immediately, so that the charts appearing in this issue will provide a start for your handy reference book. It is attractively stamped on the front cover with the Society's name.

Size 4¼ in. x 7½ in. Holds Standard 3¾ in. x 6¾ in. sheet.

This flexible leather, six-ring binder is designed so that it can be conveniently carried in the pocket and used on the job every day. The educational material sent to each member of the Society will be designed so as to fit this convenient binder, also tables, charts and other valuable data published in THE REFRIGERATION SERVICE ENGINEER. A supply of ruled memorandum paper for making notes and sketches is furnished. The educational material published in THE REFRIGERATION SERVICE ENGINEER and that sent out by the Society will provide a valuable reference book that will be an indispensable help in solving every day servicing problems.

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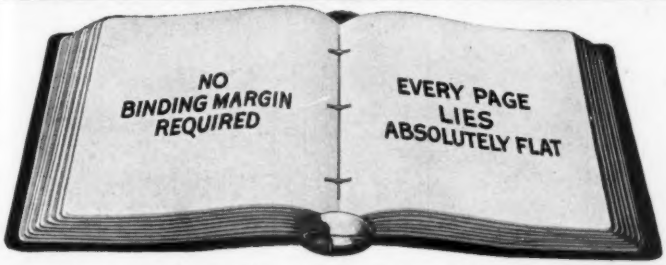

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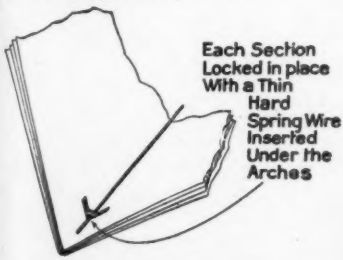

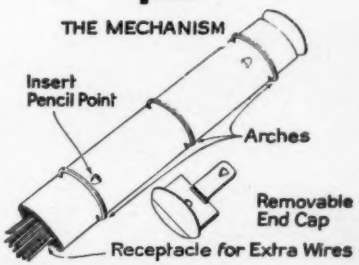

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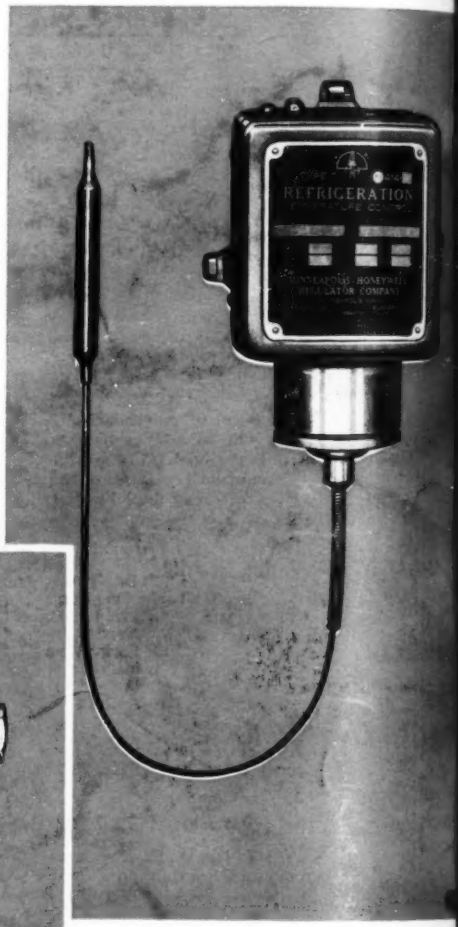

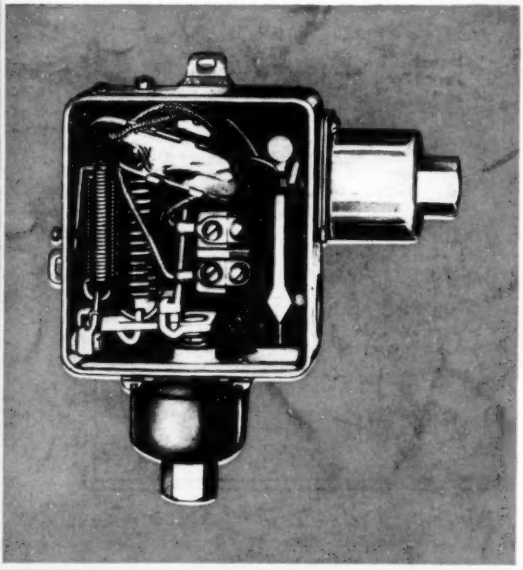

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